

# Ch 3 Stoichiometry

3.2

How atomic mass measured

Show fig 0/H  $\rightarrow$  sample vaporize

pass through  $e^-$  Beam to rip off  $e^-$  from atoms (ionizing them)

pass through mag field heavier

don't deflect as much.

lighter ones do

Measure mass

$$\frac{{}^{13}\text{C}}{{}^{12}\text{C}} = 1.0836129 \quad \begin{array}{l} \swarrow \times \text{deflect} \\ \rightarrow {}^{13}\text{C} \text{ mass} = 13.003355 \text{ amu} \end{array}$$

$\uparrow$   
mass 12.000 by def

Mass on table avg mass

$$\%_{ab} \times \text{mass} + \%_{ab} \times \text{mass} = \text{avg mass}$$

$\uparrow$

determined by mass spec

use Cu to calc

mass of  $\text{OCu}$

62.93 amu

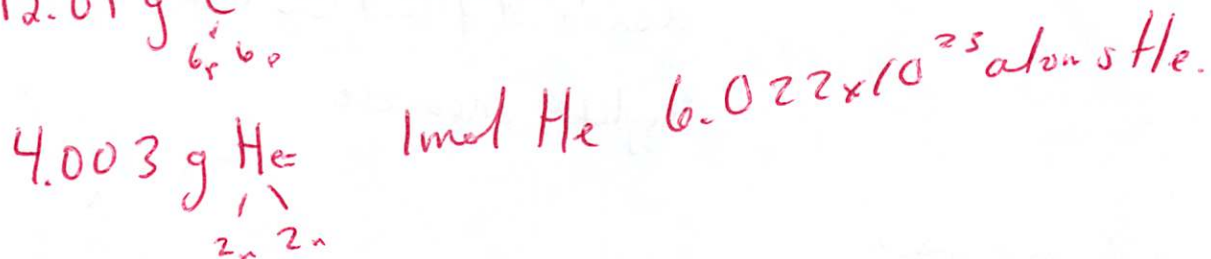
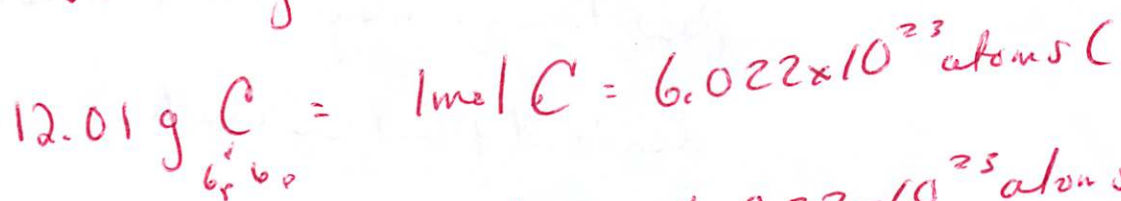
64.93 amu

### 3.3 The mole Counted using mass spec.

Made to count large #'s of atoms easier

How many things in a mole?  $6.022 \times 10^{23}$

Counting in moles makes life easier.



By definition —  $6.022 \times 10^{23} \text{ atoms } \left( \frac{12 \text{ amu}}{\text{atom}} \right) = 12 \text{ g}$   
 $6.022 \times 10^{23} \text{ amu} = 1 \text{ g}$

Do mol calculations comp's to  
g  $\rightarrow$  mol  $\rightarrow$  atom

g  $\rightarrow$  mol  $\rightarrow$  moles/ft

moles/ft  $\rightarrow$  mol-s

### 3.5 Composition Stoichiometry

% Comp go over How to calc

empirical formula } go over how to calc  
molecular formula }

How is this really done

Show example from book How it's Really done using

Combustion device

0.1156 g Comp  $\rightarrow$  0.1638 g  $\text{CO}_2$   $\leftarrow$  use %'s of  $\text{CO}_2$   
C, H, N 0.1676 g  $\text{H}_2\text{O}$   $\leftarrow$  +  $\text{H}_2\text{O}$

### 3.7 Eqns @ Go over Targen How to Balance

Show  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \rightarrow \text{Cr}_2\text{O}_3 + \text{N}_2 + 4\text{H}_2\text{O}$



### 3.9 Stoichiometry - mol Ratio % yield LR



68.5 kg CO

8.60 kg  $\text{H}_2$

$3.57 \times 10^4$  g  $\text{CH}_3\text{OH}$